

**FIELD SAMPLING PLAN
FOR THE
WESTOVER LANDFILL SITE ASSESSMENT
OREGON, LUCAS COUNTY, OHIO**

Prepared for
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region V

Prepared by
WESTON SOLUTIONS, INC.
Region V Superfund Technical Assessment and Response Team

August 14, 2009

Approved by: _____ Date: _____
U.S. EPA Region V
On-Scene Coordinator

| | |
|--|------------------|
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ACRONYM LIST

| | |
|-----------------|--|
| CFR | Code of Federal Regulations |
| COC | Contaminant of Concern |
| EPA | Environmental Protection Agency |
| ERB | Emergency Response Branch |
| OAC | Ohio Administrative Code |
| MS/MSD | Matrix Spike/ Matrix Spike Duplicate |
| NPL | National Priorities List |
| NWDO | Northwest District Office |
| OSC | On-Scene Coordinator |
| PCB | Polychlorinated Biphenyl |
| PAH | Polynuclear Aromatic Hydrocarbon |
| PFTE | Polytetrafluoroethylene |
| ppb | Part Per Billion |
| PPE | Personal Protective Equipment |
| QAPP | Quality Assurance Project Plan |
| QA/QC | Quality Assurance/Quality Control |
| RAL | Removal Action Level |
| FSP | Field sampling plan |
| SOP | Standard Operating Procedure |
| SVOC | Semivolatile Organic Compound |
| START | Superfund Technical Assessment and Response Team |
| TAL | Target Analyte List |
| TCL | Target Compound List |
| TCLP | Toxicity Characteristic Leaching Procedure |
| U.S. EPA | United States Environmental Protection Agency |
| VOA | Volatile Organic Analysis |
| VOC | Volatile Organic Compound |
| WESTON | Weston Solutions, Inc. |

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ATTACHMENTS

SOP 202 – Surface Soil Sampling

SOP 203 – Surface Water Sampling

SOP 204 – Water Level

SOP 303 – Sediment Sampling

SOP 2012 – Sampling Equipment Decontamination

1.0 Introduction

This Field sampling plan (FSP) identifies the data collection activities and associated quality assurance/quality control (QA/QC) measures specific to the Westover Landfill (the Site) located in Oregon, Lucas County, Ohio. All data will be generated in accordance with the quality requirements described in the *START III Generic QAPP*, dated June 2006. The purpose of this FSP is to describe site-specific tasks that will be performed in support of the stated objectives. The FSP will reference the QAPP for generic tasks common to all data collection activities including routine procedures for sampling and analysis, sample documentation, equipment decontamination, sample handling, data management, assessment, and data review. Additional site-specific procedures and/or modifications to procedures described in the *START III Generic QAPP* are described in the following FSP elements.

This FSP is prepared, reviewed, and approved in accordance with the procedures detailed in the *START III Generic QAPP*. Any deviations or modifications to the approved FSP will be documented using **Table 1: FSP Revision Form**.

2.0 Project Management and FSP Distribution and Project Team Member List

Management of the Site will be as documented in the *START III Generic QAPP*. Refer to the *START III Generic QAPP* for an organizational chart, communication pathways, personnel responsibilities and qualifications, and special personnel training requirements.

The following personnel will be involved in planning and/or technical activities performed for this data collection activity. Each will receive a copy of the approved FSP. A copy of the FSP will also be retained in the site file.

| Personnel | Title | Organization | Phone Number | Email |
|--------------|-------------------|--------------|----------------|--|
| Jon Gulch | OSC | U.S. EPA | (734) 740-9017 | Gulch.Jon@epamail.epa.gov |
| Alex Clark | Project Manager | START | (248) 200-9825 | A.Clark@Westonsolutions.com |
| Ryan Green | Site Leader | START | (330) 958-0037 | Ryan.Green@Westonsolutions.com |
| Tonya Balla | Health and Safety | START | (847) 918-4094 | T.Balla@Westonsolutions.com |
| Lisa Graczyk | QA Reviewer | START | (312) 424-3339 | LGrackyk@Dynamac.com |

NOTES:

OSC – On-Scene Coordinator
QA – Quality Assurance

START – Superfund Technical Assessment and Response Team
U.S. EPA – United States Environmental Protection Agency

3.0 Planning and Problem Definition

3.1 Problem Definition

The Site is a landfill located at 820 Otter Creek Road, Oregon, Lucas County, Ohio, and was referred to the United States Environmental Protection Agency (U.S. EPA) Region V Emergency Response Branch (ERB) by the Ohio Environmental Protection Agency (Ohio EPA) Northwest District Office (NWDO) on June 18, 2009, for consideration of a removal assessment. On May 3, 2007, Ohio EPA personnel identified actual and potential threats of release of liquid leachate directly into Otter Creek, situated adjacent and to the west of the Site. Reconnaissance observations from Ohio EPA personnel indicated that uncontrolled leachate outbreaks have entered the engineered storm water control structures that discharge into Otter Creek. Otter Creek flows directly into southern Maumee Bay of Lake Erie 2.5 miles to the northeast of the Site. A site location map is provided in Figure 3-1.

The U.S. EPA ERB On-Scene Coordinator (OSC) has tasked the Superfund Technical Assessment and Response Team (START) contractor Weston Solutions, Inc. (WESTON) with sample collection of liquids from available access points in the existing perimeter leachate and landfill gas collection system and the storm water control systems. START will also collect surface water and sediment samples upstream, midstream and downstream of the Site to evaluate the potential impacts of fugitive liquids on the water quality and sediment chemistry of Otter Creek. Additional judgemental grab samples will be collected from any active leachate outbreaks observed on the clay cap. Static water level measurements will be collected to assess the volume of leachate and directional flow. A site features map is provided in Figure 3-2.

3.2 Site History and Background

The Site was operated as a municipal solid waste landfill by Westover Corporation from 1975 through January 1, 1987. The Westover Corporation was dissolved in 1990 and the Site was reportedly purchased by local resident Seth Corley in early 2006. According to Ohio EPA NWDO, no regulated monitoring or maintenance of the engineered systems has taken place since the end of the closure care and monitoring period, January 1, 1990.

The entire 10.5 acre Site is situated within the watershed of Otter Creek. The western limit of waste placement was within 40 feet of the Otter Creek bed according to Ohio EPA records. Aside from the typical municipal and industrial solid wastes, several permits to install (PTI's) were approved by Ohio EPA for disposal of wastewater treatment lagoon sludge, polyurethane dust and other industrial wastes. One known instance of hazardous waste disposal occurred July 9, 1979, through July 11, 1979, when five dump truck loads of sandy soil contaminated with approximately 200 gallons of 25% hexavalent chromium were accepted. Based on the date, the hexavalent chromium waste was likely filled at an elevation below original grade and below the elevation of the Otter Creek bank. Ohio EPA records also indicate disposal of approximately fifty 55-gallon drums of asbestos containing waste in 1981.

Prior to Site closure in 1987 a combined leachate and landfill gas collection system was installed around the perimeter limits of waste placement. Ohio EPA observed standing liquids within the

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collection system at several manholes and landfill gas vents on May 3, 2007. Ohio EPA also observed leachate being discharged directly into Otter Creek from a leaking drain tile at the northwest corner of the site. Storm water discharge from landfills must not contain leachate or leachate-contaminated water under NPDES permitting. The total leachate volume within the landfill was estimated at 10 million gallons according to Ohio EPA records from 1984. The current leachate volume is unknown.

The sediment chemistry and water quality of Otter Creek has been evaluated in numerous privately- and federally-funded studies with involvement from the U.S. EPA Great Lakes National Program Office (GLNPO), Ohio EPA, the City of Toledo, the City of Oregon, and the Duck and Otter Creek Partnership, a non-profit organization. A large array of petroleum and chemical industrial properties, pipelines, railroads and other landfills have occupied portions of the Otter Creek watershed. The studies have demonstrated that Otter Creek sediments have been impacted by a wide range of point-source releases and earlier decades of historical industrial direct-discharge practices. Otter Creek sediments are known to contain elevated concentrations of polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), cationic metals (cadmium, copper, lead, nickel, silver and zinc), oil and grease.

3.3 Contaminants of Concern/Target Analytes

The START project manager, project engineer and project QA officer collaborated to produce the following list of target analytes:

| Parameter | Matrix |
|---|--------------------------------------|
| TCL VOCs | Leachate/Surface Water/Soil/Sediment |
| TCL SVOCs | Leachate/Surface Water/Soil/Sediment |
| Pesticides | Leachate/Surface Water/Soil/Sediment |
| Herbicides | Leachate/Surface Water/Soil/Sediment |
| TCL PCBs | Leachate/Surface Water/Soil/Sediment |
| TAL Metals | Leachate/Surface Water/Soil/Sediment |
| Mercury | Leachate/Surface Water/Soil/Sediment |
| Cyanide, Sulfide | Leachate/Surface Water/Soil/Sediment |
| Inorganic non-metals carbonic biochemical oxygen demand (BOD) | Leachate/Surface Water |
| Alkalinity as calcium carbonate | Leachate/Surface Water |
| Total Alkalinity | Leachate/Surface Water |
| Hardness as calcium carbonate | Leachate/Surface Water |
| Total Hardness | Leachate/Surface Water |
| Nitrate, Nitrite | Leachate/Surface Water |
| Nitrogen, ammonia as N | Leachate/Surface Water |

| Parameter | Matrix |
|--------------------------|------------------------|
| Nitrogen, total Kjeldahl | Leachate/Surface Water |
| Total Dissolved Solids | Leachate/Surface Water |
| Total Suspended Solids | Leachate/Surface Water |
| Chloride | Leachate/Surface Water |
| Ammonia | Leachate/Surface Water |
| Sulfate | Leachate/Surface Water |
| Total Cyanide | Leachate/Surface Water |
| pH, Standard Units | Leachate/Surface Water |
| Specific Conductance | Leachate/Surface Water |
| Total Phosphorus | Leachate/Surface Water |
| Total Organic Carbon | Leachate/Surface Water |
| Chemical Oxygen Demand | Leachate/Surface Water |

Notes:

SVOC – Semivolatile Organic Compound

TAL – Target Analyte List

TCL – Target Compound List

VOC – Volatile Organic Compound

If leachate outbreaks / seeps are observed on the surface of the landfill slopes, START will attempt to collect liquid samples. However, the total sample volume may be limited by the volume of liquid available at the surface. If sample volume is limited, START will consult with the OSC to prioritize the requested analyses.

4.0 Project Description and Schedule

The following tasks were requested by the OSC and are anticipated to be completed during three days of field activities the week of August 17, 2009:

- **Task 1 – Leachate Outbreaks**
 - Locate and collect GPS coordinates of any outbreaks.
 - Collect air monitoring readings at the outbreak point with a MultiRAE photoionization detector (PID) plus 4-gas monitor (carbon monoxide [CO], hydrogen sulfide [H₂S], oxygen [O₂], and lower explosive limit [LEL]) and landfill gas analyzer.
 - Collect a liquid sample of outbreaks, as practical, on the slopes of the landfill; with priority given to those outbreaks with the potential for off-site migration/discharge.
 - Collect a liquid sample of any leachate in the northern stormwater drainage ditch.
 - Collect a liquid sample of any leachate in the southwest letdown structure.
 - If applicable, collect shallow samples (upper six inches) of leachate-impacted soil.
- **Task 2 – Perimeter Leachate and Landfill Gas Collection System**
 - Collect GPS coordinates of access points (manholes and vents).
 - Collect air monitoring readings of the headspace at the top of manholes and vents.
 - Collect a liquid sample from available access points (no entry).
 - Collect a liquid level measurement at each vent.

- **Task 3 – Otter Creek**

- Conduct reconnaissance of the edge of Otter Creek to assess any direct discharges or threat of discharges from the Site.
- Collect photographs and GPS coordinates of the steel storm water pipe observed by Ohio EPA to be discharging leachate directly into Otter Creek.
- Collect a liquid sample of any leachate being discharged to Otter Creek.
- Collect surface water samples downstream, midstream and then upstream of the Site.
- Collect sediment samples downstream, midstream and then upstream of the Site.

START will have 2-3 persons on-site to perform the sampling and sample management. The sample management will consist of labeling and documenting the samples for shipment to the laboratory.

Sample labels and chain-of-custody (COC) paperwork will be generated by WESTON START. Samples will be packaged and delivered to the laboratory by WESTON START. The turnaround time for the preliminary sample data will be two weeks. The sampling results will be reviewed and validated by WESTON START. A summary report of the sampling results will be submitted to U.S. EPA within 30 days of receipt of analytical data.

5.0 Project Quality Objectives

5.1 Project Objectives

Sufficient data will be obtained from a representative number of samples to support defensible decisions by the EPA and to determine whether further actions at the Site are necessary. Sediment and surface water samples will be collected upstream of the Site to assess existing/historical contamination in Otter Creek. Representative leachate samples will be collected from landfill structures to assess the contaminant concentrations in leachate and to correlate, if possible, with discharge concentrations. Collection of sufficient quantity of leachate outbreak samples will be dependent upon the available quantity of these liquids on the date of the sampling event.

The following is a list of project objectives that apply to the site assessment:

- To determine whether a removal action is warranted and if so whether the response should be classified as an emergency, time-critical, or non-time critical removal action.
- To rapidly assess and evaluate the urgency, magnitude, extent and impact of a release, or threatened release, of hazardous substances, pollutants or contaminants, and their impact on human health and/or the environment.
- To assess air quality to determine the level of personal protective equipment that must be used by site workers and to identify safety zones at the site and the potential threat to human health (i.e. explosion hazards).
- To determine a remedy to eliminate, reduce, or control risks to human health and the

environment and to support an “Action” decision memorandum documenting the identified removal approach.

More information about the sampling procedures to support these objectives is provided in Section 6.

5.2 Measurement and Performance Criteria

Generic measurement and performance criteria described in the *START III Generic QAPP* will be used. These criteria will ensure that data are sufficiently sensitive, precise, accurate, and representative to support site decisions.

5.3 Data Quality Objectives

Data quality objectives address requirements that include when, where, and how to collect samples; the number of samples; and the limits on tolerable error rates. These steps should periodically be revisited as new information about a problem is learned.

START sample collection locations were determined based on review of historical information and discussions with the OSC. The analytical data will be compared to:

Surface water

- U.S. EPA Maximum Contaminant Levels
- Ohio EPA Water Quality Criteria

Sediment

- Consensus-Based Sediment Quality Guidelines.
- Remedial Action Objectives and other guidelines for Otter Creek and Maumee River established by GLNPO, as applicable.

Leachate

- Resource Conservation and Recovery Act Limits, as applicable.
- National Pollution Discharge Elimination System limits for Otter Creek and Maumee River.
- Ohio EPA Water Quality Criteria

6.0 Sampling Design

- **Task 1 – Leachate Outbreaks**
 - Up to a total of three liquid investigative samples will be collected from any observed leachate outbreaks on the landfill slopes or in the storm water drainage structures.
 - Up to a total of two soil investigative samples will be collected from any observed leachate outbreaks on the landfill slopes.

All liquid samples will initially be collected using a clean 4 or 8 ounce glass jar. The liquid will

then be decanted using a plastic funnel into the appropriate laboratory-supplied sampling containers.

Alternatively, a peristaltic pump and associated tubing will be used to fill the appropriate laboratory-supplied sampling containers directly from the area of pooled liquids at the leachate outbreak.

The upper six inches of soil underneath observed outbreaks, as applicable, will be collected using a hand auger or disposable scoop. The soil will be placed in a disposable foil pan for homogenization. The VOC fraction of the analytical suite will be collected first. Then, START will thoroughly homogenize the soil using a disposable plastic scoop. The homogenized soil will be placed into the remaining sample jars.

- **Task 2 – Perimeter Leachate and Landfill Gas Collection System**

- A complete round of static water level measurements and air monitoring readings will be collected from the leachate collection features and methane vent wells, as appropriate.
- Up to a total of seven liquid investigative samples will be collected from standing liquids in the manholes and vents of the perimeter leachate and landfill gas collection system

A static water level meter will be used to measure the liquid levels from the top of the cover or concrete edge for each of the manholes; and from the top of surface riser for each of the methane vent wells. The total depth of the manhole and methane vents wells will also be recorded. Air monitoring readings will be recorded at the feature head and in the breathing zone prior to collecting measurements.

START will collect grab samples of liquid from selected manholes and methane vent wells. A bailer or peristaltic pump and associated tubing will be used to collect the liquid and fill the appropriate laboratory-supplied sample containers. Water quality measurements (pH, temperature, conductivity, dissolved oxygen, and oxidation-reduction potential) will be collected prior to filling the sampling containers at each location.

- **Task 3 – Otter Creek**

- Up to a total of five surface water investigative samples will be collected from Otter Creek, upstream, midstream and downstream of Westover Landfill
- Up to a total of five sediment investigative samples will be collected from Otter Creek, upstream, midstream and downstream of Westover Landfill

START will collect sediment samples from the upper six inches of Otter Creek using a hand auger. START will retrieve sediment by donning waders and entering Otter Creek if it is deemed water levels are low enough and the substrate is firm. Alternatively, START will be positioned on the shoreline to retrieve sediment from Otter Creek using a hand auger with the appropriate extensions.

Sediment will initially be containerized into stainless steel bowls and will be homogenized using a stainless steel spoon. The homogenized sediment will be placed into laboratory-supplied jars. The

VOC fraction of the analytical suite, if collected, will be collected prior to sample homogenization.

START will collect surface water by either of the two methods described above. Surface water will initially be collected using a clean 4 or 8 ounce glass jar. The liquid will then be decanted using a plastic funnel into the appropriate laboratory-supplied sampling containers. START will also collect stream flow measurements and water quality measurements from the areas designated for surface water sampling.

START anticipates collecting the surface water and sediment samples beginning downstream and working to upstream.

Additional QA/QC samples will be collected from each matrix as needed. Samples will be analyzed for the parameters listed in Table 2. In addition, requirements for the sample container, volume, preservation, and QC samples are presented in Table 2: Sampling and Analysis Summary.

6.1 Sample Numbering System

All samples for analysis, including QC samples, will be given a unique sample number. The sample numbers will be recorded in the field logbook and on the COC paperwork.

WESTON START will assign each sample its unique number. The sample number highlights the suspected contaminated area and location, and will be used for documentation purposes in field logbooks, as well as for presentation of the analytical data in memoranda and reports. The project samples will be identified using the following format:

Project Identification Code

WLF = Westover Landfill

Matrix Identification Code

LL = Liquid Leachate matrix

SW = Surface Water matrix

SD = Sediment matrix

SS = Surface Soil matrix

QA/QC Identification Code

DP = Field Duplicate

MS = MS/MSD

RB = Rinsate Blank

Sample ID's will be constructed with the project identification followed by the matrix identification followed by the numerical sample number followed by the QA/QC identification, if applicable.

Examples of the sample identifications for the Site are as follows:

- **WLF-LL-03** = the third liquid leachate sample collected
- **WLF-LL-03-DP** = duplicate sample of WLF-LL-03
- **WLF-SD-05** = the fifth sediment sample collected from Otter Creek

6.2 Management of Investigation-Derived Wastes

For purposes of this FSP, investigation-derived wastes are defined as any byproduct of the field activities that is suspected or known to be contaminated with hazardous substances. The performance of field activities will produce waste products, such as spent sampling supplies (*e.g.*, tubing, foil pans, etc.), and expendable Personal Protective Equipment (PPE). START will also generate decontamination water.

Disposable sampling supplies and PPE will be containerized in trash bags and to remain on-site pending the receipt of sample laboratory analytical results. It is anticipated decontamination water will be dispersed on the ground surface of the landfill in an area where the decontamination water will not migrate off-site; or as specified by the OSC.

7.0 Sampling Procedures

7.1 Sampling Standard Operating Procedures

The following Standard Operating Procedures (SOPs) will be used during the site evaluation:

1. SOP 202 – Surface Soil Sampling
2. SOP 203 – Surface Water Sampling
3. SOP 204 – Water Level
4. SOP 303 – Sediment Sampling
5. SOP 2012 – Sampling Equipment Decontamination

7.2 Decontamination Procedures

General decontamination procedures are described in Section B.2 of the *START III Generic QAPP*. All non-disposable equipment (*i.e.* hand auger and water quality meter) will be decontaminated between sampling locations. The water level meter will be decontaminated prior to demobilizing from the Site.

8.0 Sample Handling, Tracking, and Custody Procedures

All samples will be identified, handled, shipped, tracked, and maintained under COC, in accordance with the *START III Generic QAPP*.

9.0 Field Analytical Methods and Procedures

9.1 Field Analytical Methods and Standard Operating Procedures

Field screening of the headspace at the top of methane vents will be conducted with a 4-gas air monitor, and landfill gas analyzer. Air monitoring readings will be recorded in the site log book. Water level measurements will be collected from methane vent wells and leachate collection structures with a standard water level meter and the measurements will be recorded in the log book.

9.2 Field Testing Laboratory

A field testing laboratory will not be used during the site assessment.

9.3 Screening/Confirmatory Analyses

Screening/Confirmatory Analyses will not be used during the site assessment.

10.0 Fixed Laboratory Analytical Methods and Procedures

Trimatrix Laboratories, Inc.
5560 Corporate Exchange Court,
Grand Rapids, MI, 49517
Contact: Phil Komar
Office: (616) 975-4500
Fax: (616) 942-7463

11.0 Quality Control Activities

11.1 Field Quality Control

The number of QC samples collected for each analytical parameter and concentration level are listed in **Table 2: Sampling and Analysis Summary**. The QC sample determination and frequency is in accordance with the *START III Generic QAPP*, Table 4.

11.2 Analytical Quality Control

QC for analytical procedures will be performed at the frequency described in the *START III Generic QAPP*, Tables 5 and 6. In addition, method-specific QC requirements will be used to ensure data quality.

11.3 Performance Evaluation Samples

Performance evaluation samples will not be used in this site assessment.

12.0 Documentation, Records, and Data Management

Documentation, record keeping, and data management activities will be conducted in accordance with the *START III Generic QAPP*, Section B.10.

13.0 Quality Assurance Assessment and Corrective Actions

Field activities are anticipated to require three days for completion; no long-term project field audit will be completed at this time.

14.0 Reports to Management

Reports to management will be written and distributed in accordance with the *START III Generic QAPP*, Section C.

15.0 Steps 1, 2 and 3: Data Review Requirements and Procedures

Step 1: Data collection activities, including sample collection and data generation, will be verified in accordance with the *START III Generic QAPP*, Section D.

Step 2: Data will be validated by WESTON START.

Step 3: Data will be reviewed for usability in accordance with the *START III Generic QAPP*, Section D.

TABLES

Table 1 **FSP Revision Form**

Site: Westover Landfill SA

OSC: Jon Gulch

TDD: S05-0001-0906-025

| Date | Revision Number | Proposed Change to FSP/QAPP | Reason for Change of Scope/Procedures | FSP Section Superseded | Requested By | Approved By |
|------|-----------------|-----------------------------|---------------------------------------|------------------------|--------------|-------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Table 2
Sampling and Analysis Summary

Site: Westover Landfill SA

OSC: Jon Gulch

TDD: S05-0001-0906-025

| Matrix | Analytical Parameter | Analytical Method | Containers (Numbers, Size, and Type) | Preservation Requirements | Number of Sampling Locations | Number of Field Duplicates | Number of MS/ MSDs ² | Number of Blanks (Trip, Field, Equip. Rinsate) ¹ | Total Number of Samples to Lab ³ | Holding Time |
|--------|--------------------------------|-------------------|--------------------------------------|---|------------------------------|----------------------------|---------------------------------|---|---|---|
| Water | TCL VOCs | 8260B | 3 x 40-ml VOA | HCl to pH<2; Cool to 4° C | 15 | 1 | 1 | 1 trip blank | 17 | 14 days |
| Water | TCL SVOCs | 8270C | 1 x 1-liter amber | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 7 days to extraction; 40 from extraction to analysis |
| Water | Pesticides | 8081A | 1 x 1-liter amber | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | |
| Water | Herbicides | 8151A | 1 x 1-liter amber | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | |
| Water | TCL PCBs | 8082 | 1 x 1-liter amber | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | |
| Water | TAL Metals (excluding mercury) | 6010B | 500-ml plastic | HNO ₃ to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 180 days |
| Water | Hexavalent Chromium | 7196A | 250-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 24 hours |

| Matrix | Analytical Parameter | Analytical Method | Containers (Numbers, Size, and Type) | Preservation Requirements | Number of Sampling Locations | Number of Field Duplicates | Number of MS/ MSDs ² | Number of Blanks (Trip, Field, Equip. Rinsate) ¹ | Total Number of Samples to Lab ³ | Holding Time |
|--------|-----------------------------------|-------------------|--------------------------------------|--|------------------------------|----------------------------|---------------------------------|---|---|--------------|
| Water | Mercury | 7470A | 250ml plastic | HNO ₃ to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | Cyanide | 9012B | 250-ml plastic | NaOH to pH>12; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 14 days |
| Water | Sulfide | 9030B | 500-ml plastic | Zinc Acetate plus NaOH to pH>9; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 7 days |
| Water | Inorganic non-metals carbonic BOD | SM 5210B | 100-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 48 hours |
| Water | Alkalinity as calcium carbonate | 310.2 | 250-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 14 days |
| Water | Total alkalinity | 310.1 | 250-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 14 days |
| Water | Hardness as calcium carbonate | 130.2 | 100-ml plastic | HNO ₃ to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 180 days |
| Water | Total hardness | 130.2 | 100-ml plastic | HNO ₃ to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 180 days |
| Water | Nitrate and Nitrite | 353.2 | 100-ml plastic | H ₂ SO ₄ to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | Ammonia as nitrogen | 350.1 | 250-ml plastic | H ₂ SO ₄ to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |

| Matrix | Analytical Parameter | Analytical Method | Containers (Numbers, Size, and Type) | Preservation Requirements | Number of Sampling Locations | Number of Field Duplicates | Number of MS/ MSDs ² | Number of Blanks (Trip, Field, Equip. Rinsate) ¹ | Total Number of Samples to Lab ³ | Holding Time |
|--------|------------------------|-------------------|--------------------------------------|--------------------------------|------------------------------|----------------------------|---------------------------------|---|---|---------------------|
| Water | TKN | 351.2 | 200-ml plastic | H2SO4 to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | Total dissolved solids | 160.1 | 100-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 7 days |
| Water | Total suspended solids | 160.2 | 500-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 7 days |
| Water | Chloride | SM 4500-Cl-E | 200-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | Sulfate | 375.2 | 200-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | pH | 150.1 | 100-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | Analyze Immediately |
| Water | Specific Conductance | 120.1 | 100-ml plastic | Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | Total Phosphorus | 365.1 | 100-ml plastic | H2SO4 to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | Total organic carbon | 415.1 | 100-ml plastic | H2SO4 to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |
| Water | Chemical Oxygen Demand | 5220D | 100-ml plastic | H2SO4 to pH<2; Cool to 4° C | 15 | 1 | 1 | 0 | 16 | 28 days |

| Matrix | Analytical Parameter | Analytical Method | Containers (Numbers, Size, and Type) | Preservation Requirements | Number of Sampling Locations | Number of Field Duplicates | Number of MS/ MSDs ² | Number of Blanks (Trip, Field, Equip. Rinsate) ¹ | Total Number of Samples to Lab ³ | Holding Time |
|-------------------|-----------------------------|-------------------|--------------------------------------|---------------------------|------------------------------|----------------------------|---------------------------------|---|---|---|
| Soil/ Sediment | TCL VOCs | 5035/ 8260B | 3-40-ml VOA vials | Methanol; Cool to 4° C | 7 | 1 | 1 | 0 | 8 | 14 days |
| Soil/ Sediment | TCL SVOCs | 8270C | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | 14 days to extraction; 40 from extraction to analysis |
| Soil/ Sediment | Pesticides | 8081A | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | |
| Soil/ Sediment | Herbicides | 8151A | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | |
| Soil/ Sediment | TCL PCBs | 8082 | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | |
| Soil/ Sediment | TAL Metals (except mercury) | 6010B | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | 180 days |
| Soil/ Sediment | Hexavalent Chromium | 7196A | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | 30 days to extraction; 7 days from extraction to analysis |
| Soil/ Sediment | Mercury | 7471A | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | 28 days |
| Soil/ Sediment | Cyanide | 9012B | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | 14 days |

| Matrix | Analytical Parameter | Analytical Method | Containers (Numbers, Size, and Type) | Preservation Requirements | Number of Sampling Locations | Number of Field Duplicates | Number of MS/ MSDs ² | Number of Blanks (Trip, Field, Equip. Rinsate) ¹ | Total Number of Samples to Lab ³ | Holding Time |
|-------------------|----------------------|-------------------|--------------------------------------|---------------------------|------------------------------|----------------------------|---------------------------------|---|---|--------------|
| Soil/ Sediment | Sulfide | 9030B | 4-ounce glass jar | Cool to 4° C | 7 | 1 | 1 | 0 | 8 | 7 days |

Notes:

¹ Trip blanks are only required for VOCs in water samples.

² For the samples designated for MS/MSDs, triple volume is required for VOCs and double volume for other water parameters.

³ Total number of samples to the laboratory does not include MS/MSD samples.

°C – Degrees Celsius

BOD – Biological Oxygen Demand

Equip. – Equipment

HCl – Hydrochloric Acid

HNO₃ – Nitric Acid

MS/MSD – Matrix Spike/Matrix Spike Duplicate

NaOH – Sodium Hydroxide

PCB – Polychlorinated Biphenyl

SVOC – Semivolatile Organic Compound

TAL – Target Analyte List

TCL – Target Compound List

TKN – Total Kjeldahl Nitrogen

VOA – volatile organic analysis

VOC – volatile organic compound

FIGURES



Legend

 Site Boundary

0 2,000
Feet



Prepared for:
U.S. EPA REGION V

Contract No.: EP-S5-06-04
TDD: S05-0001-0906-025
DCN: 680-2A-AELA



Prepared By:
**WESTON
SOLUTIONS, INC**

750 E. Bunker Court
Suite 500
Vernon Hills, Illinois 60061

Figure 1
Site Location Map
Westover Landfill SA
Oregon, Lucas County, Ohio

Image Source:
ESRI_Imagery_World_2D






Otter Creek

Millard Ave

York St

Otter Creek Rd

Legend

-  Manholes
-  Methane Vents
-  Leachate Collector
-  Leachate Outbreak
-  Site Boundary

0 400
Feet



Prepared for:
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Figure 2
Site Features Map
Westover Landfill SA
Oregon, Lucas County, Ohio

ATTACHMENTS